PROCEEDINGS
OF THE
ROYAL SOCIETY OF EDINBURGH.

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Sixty-eighth Session.

Monday, 2d December 1850.

Sir T. M. BRISBANE, Bart., President, in the Chair.

The following Communications were read:—

1. Description and Analysis of Gurolite, a new Mineral Species. By Dr T. Anderson.

The mineral described and analysed by the author was found at Stow, in Skye, where it occurs associated with apophyllite, stilbite, and other zeolitic minerals. It is found principally in a compact basalt, different from that in which these minerals are most abundant, and which appears to have been produced by a different eruption of basaltic matter.

Gurolite occurs in the form of radiated crystalline masses with a fine lustre. It cleaves readily parallel to the plates of which the concretions are composed, and its hardness is about 3. Before the blow-pipe alone it swells up, loses water, and finally fuses with some difficulty into an opaque glass. Its analysis leads to the chemical formula $2\ (\mathrm{Ca\,O\ Si\,O_3}) + 3\ \mathrm{HO}$.

The author referred to the relations which this mineral bears to the other silicates of lime, of which three are already known, the names and formulæ of which are as follows:—

Wollastonite (tabular spar),	$2\,Ca\,O\,3\,Si\,O_3$.
Kalk-trisilicat of Gjellebäck,	$Ca\,O\,Si\,O_3$.
Gurolite, . . .	$2\,(Ca\,O\,Si\,O_3) + 3\,Ho$.
Dysclasite, . . .	$3\,Ca\,O\,4\,Si\,O_3 + 6\,Ho$.

It thus appears that gurolite is the same silicate of lime as the kalk-trisilicat, in union with water, and that its relation with dysclasite is such that two equivalents of gurolite differ from one of dysclasite by a single equivalent of lime only.

2. On the Constitution of Bebeerine. By Dr A. Von Planta.

The author commenced his paper by referring to the analyses of Maclagan and Tilley, which gave for the composition of bebeerine a formula precisely the same as that of morphia, but as that formula appeared to require confirmation, he had undertaken the careful re-investigation of bebeerine.

In the commencement of his experiments he had employed the same process for the purification of bebeerine as that recommended by Dr Maclagan. He soon ascertained, however, that in this way it was impossible to obtain it in a state of absolute purity, as even when every care had been taken, it always retained a small quantity of a substance resembling tannine, which caused it slowly to gain weight in the process of drying the water bath. After several trials he found the following process to yield pure bebeerine :—The substance already partially purified by Maclagan's process was dissolved in acetic acid, and mixed with a solution of acetate of lead and caustic potash gradually added as long as a precipitate of bebeerine mixed with oxide of lead was obtained. The precipitate was then washed and dried and extracted with absolute ether, and the filtered ethereal solution distilled. A syrupy residue was obtained, which was dissolved in absolute alcohol, and mixed with a large quantity of water.

Bebeerine so prepared is a perfectly colourless and inodorous powder persistent in the air and highly electrical. It fuses at 356° into a colourless glassy mass. The quantity employed for analysis was from two different preparations, and gave the following results :—

	I.	II.	III.
Carbon, . . .	73·06	72·85	72·82
Hydrogen, . .	6·80	6·99	6·89
Nitrogen, . .	4·53	4·53	4·53
Oxygen, . . .	15·61	15·63	15·76
	100·00	100·00	100·00

Results which correspond with the formula $C_{38} H_{21} NO_6$

	Mean.	Calculation.		
Carbon, .	72·91	73·31	C_{38}	228
Hydrogen, .	6·89	6·75	H_{21}	21
Nitrogen, .	4·53	4·50	N	14
Oxygen, .	15·67	15·44	O_6	48
	100·00	100·00		292

The mean of four closely agreeing analyses of this platinum compound gave the following results, which fully confirm this formula :—

	Mean.	Calculation.		
Carbon, . .	44·09	44·06	C_{38}	228
Hydrogen,	4·46	4·25	H_{22}	22
Nitrogen,	2·71	2·70	N	14
Oxygen,		9·30	O_6	48
Chlorine,		20·59	Cl_3	106·5
Platinum,	18·90	19·08	Pt	98·7
		100·00		517·2

From these analyses the author concludes that there can be no doubt that the constitution of bebeerine is represented by the formula $C_{38} H_{21} NO_6$.

3. On the Vibrations of Plane-Polarised Light. By W. J. Macquorn Rankine, Esq.

If the plane of polarisation is normal to the direction of vibration, according to the conjecture of Fresnel, which seems to be supported by the phenomena of reflexion, the velocity of propagation of light in a crystalline medium is a function of the *direction of vibration.*

If, on the contrary, the plane of polarisation is parallel to the direction of vibration, the velocity of propagation is a function of the position of the *plane which includes the direction of vibration, and the direction of transmission.*

If the velocity of polarised light in a crystalline substance depends on the elasticity of the luminiferous medium alone, the latter view must be adopted, and Fresnel's supposition rejected; for a wave of light is a wave of distortion; and the rigidity, or elasticity which resists distortion, is, in all conceivable media, a function of the position of the plane of distortion, being the same for all directions of distortion in a given plane.

But the experiments of Mr Stokes on diffracted light (Cambr. Trans., Vol. ix., Part 1) prove that Fresnel's conjecture is correct, the plane of polarisation being normal to the direction of vibration: therefore the propagation of light in crystalline media does *not* depend on elasticity alone.

The author of this paper supposes, according to the hypothesis of molecular vortices (Trans. Roy. Soc. Edin., Vol. xx., Part 1), that the medium which transmits light and radiant heat consists of the *nuclei* of the atoms of matter, of very small mass, but exerting intense mutual forces, vibrating almost independently of the atmospheres which surround them. Each nucleus, however, carries along with it in its oscillations a small portion of atmosphere, which acts as a load, retarding the velocity of propagation. In the celestial space, this load is insensible, and it is, generally speaking, greater, the more dense the substance. In crystalline media, the atmosphere of each nucleus is distributed round it symmetrically with respect to three axes, but not equally in all directions; so that the load upon the nucleus, and consequently the velocity of propagation, is *a function of the direction of vibration*, as conjectured by Fresnel.

The author further shews, that according to this hypothesis, if the range of variation of the velocity of propagation of luminiferous transverse vibrations is small (as it is in all known media), that velocity must vary sensibly as the reciprocal of the diameter of an ellipsoid, drawn parallel to the direction of vibration. It is well known that this law is the foundation of the whole of Fresnel's theory of double refraction.

4. On the Mechanical Action of Heat. By W. J. Macquorn Rankine, Esq. Note as to the Dynamical Equivalent of Temperature in Liquid Water, and the Specific Heat of Atmospheric Air and Steam.

In the author's paper on the Mechanical Action of Heat (Trans. Roy. Soc. Edin., Vol. xx., Part 1), the calculations depending on the dynamical equivalent of temperature in liquid water were founded on the experiments of De la Roche and Bérard on the ratio of the apparent specific heat of atmospheric air under constant pressure to that of water. The equivalent thus obtained was about one-tenth part less than Mr Joule's. Since then, the author, having become acquainted with the details of Mr Joule's experiments, has come to the conclusion that Mr Joule's equivalent is correct to about $\frac{1}{300}$ of its amount, and that the discrepancy in question originates chiefly in the experiments of De la Roche and Bérard. The calculations requiring correction from this circumstance are contained in the second and third sections of the above-mentioned paper, articles 14 and 20, equations 28, 34, and 36. The following is a summary of the corrected results:—

Dynamical specific heat of liquid water, as determined by Mr Joule from experiments on friction (Phil. Trans., 1850)—

	Mètres.	Feet.
Per centigrade degree, .	423·54	1389·6
Per degree of Fahrenheit, ...		772

Specific heat of atmospheric air, that of liquid water being taken as unity—

Real, ...	0·1717
Apparent, under constant pressure, ...	0·2404
(The same, according to De la Roche and Bérard,	0·2669)

Dynamical specific heat of steam—

	Mètres per Centig. degree.	Feet per Centig. degree.	Ft. per deg. of Fahr.
Real, ...	82·40	269·35	149·64
Apparent, under constant pressure,	129·18	422·83	235·46

Ratio of those two specific heats, 1 : 1·57.

Specific heats of steam, that of liquid water being taken as unity—

Real, 0·194 ; apparent, at constant pressure, 0·305.

The calculations and tables relative to the working of the steam-engine require no correction ; as the discrepancy in question has no effect on the computation of the action of the steam at full pressure, and no effect appreciable in practice on that of its expansive action.

The following Gentlemen were duly elected Ordinary Fellows :—

Dr R. D. THOMSON, Glasgow.
Dr MORTIMER GLOVER, Newcastle.

The following Donations to the Library were announced :—

Essai de Phytostatique appliqué à la Chaine du Jura et aux Contrées Voisines, par M. Thurmann. 2 Tom. 8vo.—*By the Author.*

The American Journal of Science and Arts. Conducted by Professors Silliman and Dana. Vol. IX., No. 26. ; Vol. X., Nos. 28 & 29. 8vo.—*By the Editors.*

Annals of the Lyceum of Natural History of New York. Vol. V., No. 1 ; Vol. IV., No. 12. 8vo.—*By the Lyceum.*

Journal of the Asiatic Society of Bengal. Edited by the Secretaries. Nos. 207 & 212. 8vo.—*By the Society.*

Memorie della R. Academia delle Scienze di Torino. Serie 2da, Tom. X. 4to.—*By the Academy.*

Journal of the Statistical Society of London. Vol. XIII., Part 2. 8vo.—*By the Society.*

Proceedings of the American Philosophical Society. Vol. V., No. 44. 8vo.—*By the Society.*

Proceedings of the Royal Society. 1849. Nos. 73 & 74. 8vo.—*By the Society.*

Memoirs of the American Academy of Arts and Sciences. N. S. Vol. IV., Part 1. 4to.—*By the Academy.*

Proceedings of the Royal Astronomical Society. Vol. X., No. 7. 8vo.—*By the Society.*

Q. Journal of the Chemical Society. No. 10. 8vo.—*By the Society.*

Report of the 19th Meeting of the British Association for the Advancement of Science. 1849. 8vo.—*By the Publisher.*

Scientific Researches, Experimental and Theoretical, in Electricity, Magnetism, Galvanism, Electro-Magnetism, and Electro-Chemistry. By William Sturgeon. 4to.—*By the Author.*

Journal of Agriculture and Transactions of the Highland and Agricultural Society of Scotland. Nos. 29 & 30, N. S. 1850. 8vo.—*By the Society.*

Astronomical, Magnetical, and Meteorological Observations made at the Royal Observatory, Greenwich. 1848. 4to.—*From the Observatory.*

Medico-Chirurgical Transactions, published by the Medico-Chirurgical Society of London. Vol. XXXIII. 8vo.—*By the Society.*

An Enquiry into M. Antoine d'Abadie's Journey to Kaffa, to discover the Source of the Nile. By C. T. Beke. 8vo.—*By the Author.*

Jahrbuch der Kaiserlich-Königlichen Geologischen Reichenstalt. 1850. No. 1. Jan. Feb. Marz. 8vo.—*By the Institute.*

Philosophical Transactions of the Royal Society of London. 1850. Part 1. 4to.—*By the Society.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Wien. 1848–50. 8vo.—*By the Academy.*

Case of Catalepsy, with Remarks. By James Stark, M.D. 8vo.

Two Cases of Rupture of the Crucial Ligaments of the Knee-Joint. By James Stark, M.D. 8vo.—*By the Author.*

Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. XII., Part 2. 8vo.—*By the Society.*

La Thermacrose, ou la Coloration Calorifique, par M. Melloni. 8vo.—*By the Author.*

On the Pelorosaurus ; an undescribed gigantic terrestrial reptile whose remains are associated with those of the Iguanodon, &c. On a Dorsal Dermal Spine of the Hylaeosaurus, recently discovered in the Strata of Tilgate Forest, Sussex. By G. A. Mantell, LL.D. 4to.—*By the Author.*

Supplementary Observations on the Structure of the Belemnite and Belemnostenthis. By G. A. Mantell, LL.D. 4to.—*By the Author.*

Quarterly Journal of the Chemical Society. Oct. 1850, No. 11. 8vo.—*By the Society.*

Collection of French Admiralty Charts.—*By the French Government.*

Proceedings of the Philosophical Society of Glasgow. 1849–50. Vol. III., No. 2. 8vo.—*By the Society.*

Bulletin de la Société Impériale des Naturalistes de Moscou. 1847, No. 3. 1848, Nos. 1 & 2. 8vo.—*By the Society.*

Flora Batava. Parts 163 and 164. 4to.—*By the King of Holland.*

Journal of the Royal Geographical Society of London. Vol. XX., Part 1. 8vo.—*By the Society.*

Bulletin de la Société de Géographie. 3me Serie. Tom. XIII. 8vo. —*By the Society.*

Gelehrte Anzeigen. herausg. von Mitgliedern der K. Bayerischen Akademie der Wissenschaften. Bde. 28 & 29. 4to.—*By the Academy.*

Det K. Dânske Videnskab. Selskabs Skrifter. Femte Række. Naturvidenskabelig og Mathematisk Afdeling. 1te Bd. 4to.—*By the Society.*

Astronomical Observations made at the Royal Observatory, Edinburgh, by the late T. Henderson, Esq. Vol. IX. 1843. 4to.—*From the Observatory.*

Results of the Observations made by Rev. F. Fallows, at the R. Observatory, Cape of Good Hope, in the years 1829, 1830, 1831. Reduced under the superintendence of G. B. Airy, Esq. 4to.—*By the Editor.*

Abhandlungen über das Wesen der Imponderabilien, von L. Ph. Wüppermann. 1r Theil. 1e Abtheil. 8vo.—*By the Author.*

Abhandlungen der Philosophisch-Philologischen Classe der K. Bayerischen Akad. der Wissenschaften. Bd. 5. Abtheil. 3. 4to.

Abhandlungen der Mathematish-Physikalischen Classe der K. Bayerischen Akad. der Wissenschaften. Bd. 5. Abtheil. 3. 4to.—*By the Academy.*

Ueber den Antheil der Pharmacie an der Entwicklung der Chemie, von Dr Ludwig A. Buchner jun. 4to.—*By the Author.*

Archives du Muséum d'Histoire Naturelle. Tom. IV., Livraisons 3 & 4. 4to.—*By the Museum.*

Monday, 16*th December* 1850.

Sir D. BREWSTER, K.H., Vice-President, in the Chair.

The following Communications were read:—

1. Notice of a Roman Practitioner's Medicine Stamp, found near Tranent. By Professor Simpson.

At several of the stations throughout Western Europe that were formerly occupied by the colonists and soldiers of Rome, small engraved stones have been found, the inscriptions upon which shew them to have been used as medicine stamps by the Roman doctors who, many centuries ago, practised in these localities.

These medicine stones or stamps all agree in their general characters. They commonly consist of small quadrilateral or oblong pieces of a greenish-coloured steatite, engraved with a legend on one or more of their edges or borders. The inscriptions or legends are in small capital Roman letters, cut intagliate and retrograde, and consequently reading on the stone itself from right to left, but making an impression, when stamped upon wax or any other similarly plastic material, which reads from left to right.

The inscriptions themselves generally contain, and have engraved on each separate side, first the name of the medical practitioner to whom the stamp pertained, then the name of some special medicine or medical formula out of Galen, Scribonius Largus, or some of the more popular medical authorities of those times ; and, lastly, the name of the disease or diseases for which that medicine was prescribed.

In almost all, if not all, of the Roman medicine stamps hitherto discovered, the medicines mentioned on them are drugs for affections of the eye, and the diseases, when specified, are always ophthalmic diseases.

Above fifty such Roman medicine or oculist stamps have now been discovered on the continent of Europe, at stations occupied of old by the colonists and soldiers of Rome, and particularly in France, Germany, and Holland. Only two have been detected in Italy. About ten or twelve have been discovered among the old Roman stations in England. One was, some years ago, found amid a quantity of broken tiles, brick, and other debris of an old (and probably Roman) house near to the church of Tranent, and consequently not far from the old and extensive Roman town or station of Inveresk. This Roman medicine stamp, now deposited in the Scottish Antiquarian Museum, is remarkable both as being thus found on almost the very frontier of the ancient Roman Empire, and as being one of the most perfect yet discovered.

The stone is of the figure of a parallelogram about an inch and a-half in length, and a quarter of an inch in thickness, and with inscriptions cut upon two of its sides. The two inscriptions read as follows when we separate the individual words composing them from each other :—

1. L. VALLATINI EVODES AD CI-
CATRICES ET ASPRITUDIN

2. L. VALLATINI APALOCRO-
CODES AD DIATHESIS

When the elisions and contractions which exist in these (as in almost all other Roman inscriptions) are supplied, the two legends may be read as follows :—

1. L*ucii* VALLATINI EVODES AD CICATRICES ET ASP*e*RITUDIN*es*.— *The Evodes of Lucius Vallatinus for cicatrices and granulations.*

Several of the collyria described in the works of Galen, Celsus, Aetius, &c., and inscribed on the oculist-stamps, derived their designation from some special physical character. The present instance is an example in point, the appellation *Evodes* (ἐυώδες) being derived from the pleasant odour (ἐῦ, well, and ὄζω, I smell) of the composition. Marcellus, in his work " De Medicamentis," specially praises the collyrium known under the name of *Evodes;* and that too in the class of eye diseases mentioned on the Tranent seal. For, in his collection of remedies for removing ulcers, cicatrices, &c., of the eyes and eyelids, he recommends (to use his own words) " præcipue hoc quod quidam Diasmyrnon, nonnulli *Evodes*, quia boni odoris est, nominant." And he directs the *Evodes* to be dissolved and diluted in water, and introduced into the eyes with a probe, or after inverting the eyelid, when it was used with the view of extenuating recent cicatrices of the eyes, and removing granulations of the eyelids,— " ex aqua autem ad cicatrices recentes extenuendas, et palpebrarum asperitudinem tollendam teri debet, et subjecto specillo aut inversa palpebra, oculis inseri." *

Scribonius Largus had previously described, in nearly the same words, the collyrium,—" quod quidam εὐώδες vocant," and its uses in recent cicatrices and granulations, &c. Both these authors give the same recipe for the composition of the *Evodes*,—viz., pompholyx, burnt copper, saffron, myrrh, opium, and other ingredients, rubbed down in Chian wine. Its agreeable odour was probably owing to a considerable quantity of spikenard being used in its composition.† Galen gives two other collyria, of a different composition, and for other affections, as known at his time under the same name of *Evodes*,—the one termed the " *Evodes* of Zosimus," the other the " diasmyrnon *Evodes* of Syneros." ‡

2. L. VALLATINI APALOCROCODES AD DIATHESIS.—*The mild Crocodes of L. Vallatinus, for affections of the eyes.*

The term diathesis in this inscription is used in a different sense from that in which we now employ the same word in modern medicine. At the present day, we apply the term diathesis to designate the tendency or predisposition to some special disease, or class of diseases. In the times of the Roman physicians, it was often used as synonymous with disease itself; and in the Latin translations of the Greek texts of Galen, Aetius, &c., it is hence rendered usually by the general word " affectus," " affectio," &c. The first sentence in Paulus Ægineta's chapter on Ophthalmic Diseases, affords an instance in point: " Quum dolores vehementiores in oculis fiunt, considera ex quarum affectione (διαθεσει) oculum dolere contingit." § Thus, also, the *Evodes* of Zosimus (to which I have before alluded) is entered by Galen as a remedy simply against " dolores et recentes affectus," according to the Latin translation of Kuehn,—" προς περιωδυνιας και προσφατους διαθεσεις," according to the original Greek text. Galen uses in fact diathesis as a general term for eye diseases. " Scripsi omnia quæ necesse est Medicum de oculorum affectibus (διαθεσεων) nosse." * In the inscription on the seal,—diathesIS stands instead of the common Roman accusative diathesES, or the Greek accusative diathesEIS.

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* Medicæ Artis Principes, p. 273.

† Medicæ Artis Principes: Scribonii Largi de Compositione Medicamentorum Liber. Comp. xxvi., p. 198.

‡ Galeni Opera Omnia. (Kuehn's Edit.) Vol. xii., p. 753 and 774.

§ Cornarius' Latin Translation in Principes Med. Artis, p. 432.

The collyrium mentioned in the prescription (the *Crocodes*) derives its designation from its containing the crocus, or saffron, as one of its principal ingredients.

In describing the therapeutic effects of the crocus, Dioscorides mentions as its first special use—its efficacy in "fluxions of the eyes."†

Pliny, in enumerating the qualities of the crocus, begins by observing, that it has a discutient effect upon all inflammations, but chiefly on those of the eyes (discutit inflammationes omnes quidem, sed oculorum maxime); and in speaking of its combinations he tells us that it has given a name to one collyrium (collyrio uno etiam nomen dedit).‡ But it entered into the composition of very many of the ancient eye medicines, and more than one of these passed under the name of *Crocodes*, as in the inscription on the seal. Galen, in his list of eye remedies, gives a recipe for the composition of a *Crocodes* collyrium for epiphoræ, pains and affections (διαθεσεις) from wounds of the eye.§ He discusses the composition also of the aromatic *Crocodes* of Heraclides, and the oxydercic *Crocodes* of Asclepius, &c.‖ When describing, in another part, the remedies for ulcers of the eyes, he mentions a collyrium containing crocus, and adds, "habet autem plurimum in se crocum, unde etiam croceum (κροκωδες) appellatur."¶

Celsus, Alexander Trallianus, and Paulus Ægineta, give recipes for eye collyria, under the name of diacrocus (δια κροκος).**

We have not yet alluded to the expression APALO, standing before *Crocodes*. This expression presents the only difficulty in reading the inscription; and various suggestions might be offered in regard to its explanation. But it seems most probable that it was used as a qualifying term to the *Crocodes*. Several of the collyria have the Latin adjective "lene," and "leve," placed before them, in order to certify their mild nature. Scribonius Largus gives a whole division of collyria, headed "Collyria composita levia." Aetius has a chapter, "De Lenibus Collyriis." The expression *apalo*, as a part and prefix to *Crocodes*, would seem to indicate the same quality in the crocodes vended, of old, to the Roman colonists and inhabitants of the Lothians, by Vallatinus of Tranent, the term being in all likelihood derived from the Greek adjective *απαλος*, or the corresponding Latin adjective *apalus* (mild, soft). Homer frequently uses the word as signifying soft, delicate, and especially as applied to different parts of the body (See Iliad, book iii. 371; xvii. 123, &c.); and, indeed, both Aetius and Paulus Ægineta employ the Greek adjective therapeutically in the sense of mild, and as applied to collyria. In the treatment of acute inflammatory ulcers of the eye, after inculcating the usual antiphlogistic treatment, Aetius adds, "collyria vero tenera (*απαλα*) ulcerato oculo infundantur."* When speaking of carbuncles and carcinoma of the eye, Paulus Ægineta observes that the affection may be alleviated "by the injection of soothing (tenera, *απαλα*) collyria, such as the Spodiacum, Severianum, and the like."†

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* Kuehn's Edit. of Galen, xii., p. 699.

† P. Dioscoridis Opera quæ extant Omnia. (Edit. Saraceni., 1698.) P. 21, lib. i., cap. xxv.

‡ Naturalis Historia. Leyden edit. of 1635. Vol. ii., p. 473.

§ Opera a Kuehn. Tom. xii., p. 770.

‖ Ibid. Pp. 785 and 773.

¶ Ibid. P. 713.

** See Milligen's Celsus, p. 295; Principes Artis Medicæ, p. 170 of Part II. and p. 432 of Part III. Our own Pharmacopœias long retained similar terms. The London Pharmacopœia, for example, for 1662, contains an electuary termed Diacrocuma, an emplastrum Oxycrocum, &c.

Other Roman medicine stamps with analogous oculist legends and collyria have, in England, been found at Colchester, Bath, Wroxeter, Cirencester, Kenchester, Littleborough, St Albans, &c. &c.

2. Astronomical Notices. By Professor C. Piazzi Smyth.

These Notices were chiefly derived from the ordinary correspondence of the Royal Observatory of Edinburgh, from the important character of some of which Professor P. Smyth hoped that extracts from the best of the letters might be of interest to the Society.

He alluded first to the astronomers of the United States, a large and increasing body, of no mean order of excellence already, and of the richest promise. Professor Loomis' recent work, which was exhibited, gives sufficient facts to prove the above statements.

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* Cornarius' Latin edit. of Aetius, 1549, p. 371; and Venice Greek edit., p.126.

† Dr Adams' Sydenham Society edition, Vol. i., p. 419; and the Basle Greek edition, p. 76.

Dr Locke's pamphlet on his electric observing clock was also shewn; and mention was made of the discovery of the third ring of Saturn, a faint ring interior to the older ones, about one-fourth of their united breadth, but apparently thicker.

The period of the new Bond and Lassel satellite of Saturn, Hyperion, was given at 21·18 sidereal days.

Attention was called to a map of the solar eclipse of July 28, 1851, sent from the Vienna Observatory, and the great importance of having the phenomenon extensively observed was pointed out.*

The periods of the new planets, Victoria and Egeria, were given, as well as their places for the month, together with that of Faye's comet, expected on its return to perihelion.

The successful manufacture of telescopes in this country, especially of reflecting ones, was then spoken of, and the attempt that had been made, but unhappily without success, by some scientific societies and private individuals to persuade Government to establish one of these instruments in some more favourable climate than that of the British Islands.

It appears that we can make at home far better reflectors than any other nation, but cannot use them on account of clouds; but we possess colonies nearer the equator with almost cloudless skies, and with high mountains, or table lands, on which the telescopes might be raised above all the grosser part of the atmosphere, and some of our astronomers are most anxious to go out in charge of such instruments, confident of the rich results which they must yield under such favourable circumstances,—but yet the Government refuses to do anything.

3. Farther Observations on Glaciers,—(1.) Observations on the Movement of the Mer de Glace down to 1850. (2.) Observations by Balmat, in continuation of those detailed in the Fourteenth Letter. (3.) On the gradual passage of Ice into the Fluid State. By Professor J. D. Forbes.

"It will be recollected that a remarkable stone called 'La pierre platte,' was one of the earliest points on the Mer de Glace at Chamouni whose position was ascertained by me in 1842. Its daily motion was watched by me during that summer, and its annual motion was ascertained by renewed observations in 1843, 1844, 1846, and again this year. I measured the distance along the ice from the original position of the 'Pierre platte' on the 27th June 1842 (ascertained by reference to fixed marks on the rocks) to its position on the 12th July 1850, and found it to be 2520 feet. But, of this distance, 1212 feet had been travelled at my previous observation on the 21st July 1846, leaving 1308 feet during the last four years against 1212 in the first four. When more accurately stated and compared, the mean annual and daily motions will stand as follows:—

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* The line of central obscuration passes nearly through the cities of Gottenburg and Dantzic, and both are included within the limits of complete eclipse.

	1842–3.	1843–4.	1844–6.	1846–50.
Daily motion, in INCHES,	9·47	8·56	10·65	10·81
Annual motion, in FEET,	288·3	260·4	323·8	328·8

We cannot infer, with absolute certainty, that the slight increase of velocity here noticed since 1844 is due to a change in the conditions of the glacier (although I believe that the recurrence of several snowy seasons and the very marked increase of the volume and extent of the glacier during these years would produce such an effect), because it has moved nearly half-a-mile from its position when first observed, and the part of the glacier on which it now lies may be subject to different accelerating and retarding causes.

"It is mentioned in my Thirteenth Letter on Glaciers in Professor Jameson's Journal, that I marked a fine solitary block towards the centre of the Mer de Glace opposite 'Les Ponts' with the letter V in 1846, and that I took angles for fixing its place with reference to the adjacent rocks. It was then about 760 feet distant from the west bank. I had little difficulty in recognizing the block in 1850, although it had travelled a great distance, and was considerably lower than the Montauvert. It had preserved its parallelism to the shore, for I found it at almost the same distance from the west bank as at first; and by measuring carefully along the side of the glacier, I estimated its progress in four years, from 30th July 1846 to 13th July 1850, at 3255 feet. This gives, for the mean motion in 365 days, 822·8 feet, or the mean daily motion 27·05 inches, which is remarkably large. Its position is very near the point of one of the

' dirt-bands,' but a little nearer the western bank. It lies, however, *on* the band.

" I shall now give the sequel of my guide Auguste Balmat's observations on the motion of the Glacier des Bois (the outlet of the Mer de Glace), and of the Glacier des Bossons, since the period to which the table in my Fourteenth Letter extends, which will be found to embrace *continuous* observations, by periods of a few weeks from the 2d October 1844 to the 21st November 1845. They were continued in like manner until the 19th February 1846, when they were interrupted by Balmat's illness, which was accompanied by inflammation of the eyes. But in October of the same year they were resumed, and were continued without intermission until the end of June 1848, embracing altogether a period of nearly four years, with only eight months' intermission. It is necessary to observe that the station on the glacier of Bossons was altogether changed after the above mentioned interruption, being transferred from the west to the east side (in the same region of the glacier), and it was 340 feet from the bank. The station on the Glacier des Bois was almost unchanged, and was about 280 feet from the north bank, between the Côte du Piget and the acclivity of the Chapeau. I have added a column giving the mean of the temperatures of the several periods of observation, carefully calculated from the published observations at Geneva and the great St Bernard, on the same principle as I have fully explained in my Fourteenth Letter above referred to. The comparisons of the temperature and the rate of motion lead to conclusions similar to those which I have drawn in that paper from the earlier observations, the general observation always holding that the acceleration in spring is in a greater proportion to the temperature than at any other season of the year, on account of the great influence of the melting snows in imparting fluidity to the glacier masses. I do not mean that the comparison leads always to consistent results. I do not think that the causes of the comparative acceleration of one glacier and retardation of another have yet been clearly brought out, though I conceive that accurate local observations, combined with such measurements, would gradually but surely unveil them. Nor do I mean to affirm that measurements made with so much labour and trouble, and under circumstances even of personal danger at certain seasons of the year, are irreproachable in point of accuracy. I think it even probable that oversights have occurred; but I have very strong reason for confiding in the absolute fidelity with which the observations have been made and transmitted to me.

TABLE shewing the mean daily motion in inches of the Glaciers of Chamouni deduced from Balmat's Observations, and continued from the Fourteenth Letter.

Intervals of Observation.	Mean Daily Motion in Eng. inches.				Temp. Centigrade of Air.*	Remarks.
	Bois, No. I.	Bois, No. II.	Bossons, No. I.	Bossons, No. II.		
			west side			
1845. Nov. 16 to Dec. 16	14·0	10·9	30·2	6·4	−1°·47	
Dec. 16 to Jan. 19	12·0	5·7	18·8	10·0	−4·19	
1846. Jan. 19 to Feb. 19	16·1	5·1	16·9	13·0	−0·16	
(Observations interrupted by Balmat's illness.)						
			east side.			
Oct. 12 to Nov. 19	21·8		10·8		1·65	16th Oct. Snow at Montanvert.
Nov. 19 to Dec. 20	24·0		13·1		−4·41	
Dec. 20 to Jan. 18	24·5		12·8		−5·88	
1847. Jan. 18 to Mar. 4	31·5		14·5		−4·82	Vast quantity of snow. Destructive avalanches.
Mar. 4 to Apr. 12	34·5		13·9		−1·08	
Apr. 12 to May 14	37·3		19·7		3·10	
May 14 to July 2	34·2		22·6		9·97	Snow disappeared on Bossons, 2d. week of May: on Bois, 3d week of May.
July 2 to July 23	30·5		23·1		13·88	
July 23 to Aug. 16	34·0		25·8		11·89	
Aug. 16 to Sept. 9	44·7		23·5		9·65	
Sept. 9 to Sept. 28	37·7		22·6		7·95	
Sept. 28 to Oct. 18	32·2		21·5		5·34	
Oct. 18 to Nov. 6	30·7		14·5		3·41	
Nov. 6 to Nov. 27	30·2		10·7		0·24	
Nov. 27 to Jan. 10	24·4		10·5		−3·74	
1848. Jan. 10 to Feb. 19	26·5		14·5		−5·79	
Feb. 19 to Apr. 1	23·5		12·6		−0·64	
Apr. 1 to May 3	33·8		18·8		4·93	
May 3 to June 6	35·3		17·6		8·68	
June 6 to June 30	43·8		17·6		11·57	

"I have formerly taken occasion to mention experiments and observations which have occurred from time to time of a nature to confirm the fundamental hypothesis of the *quasi* fluidity of the ice of glaciers on the great scale, and I cannot doubt that these incidental remarks have tended to diminish the natural incredulity with which that theory was at first received in some quarters. I have now to cite a fact of the same kind established by a French experimenter, M. Person, who appears not to have had even remotely in his mind the theory of glaciers when he announced the following fact, viz. :—That ice does not pass *abruptly* from the solid to the fluid state. That it begins to *soften* at a temperature of 2° centigrade below its thawing point: that, consequently between 28·°4 and 32° of Fahrenheit, ice is actually passing through various degrees of plasticity, within narrower limits, but in the same manner that wax, for example, softens before it melts. M. Person deduces this from the examination of the heat requisite to liquify ice at different temperatures. The following sentences contain his conclusions in his own words :—" Il parait d'après mes experiences que le ramollissement qui précède la fusion, est circonscrit dans une intervalle d'environ 2 degrés. La glace est donc un des corps dont la fusion est la plus nette; mais cépendant le passage de l'état solide à l'état liquide s'y fait encore par degrés, et non par un saut brusque."*

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* Mean of Geneva and Great St Bernard.

" Now it appears very clearly from M. Agassiz' thermometrical experiments, and from my own observations, that from 28° to 32° Fahr. is the habitual temperature of the great mass of a glacier; that the most rigorous nights propagate an intense cold to but a very small depth; and I am perfectly convinced that in the middle and lower regions of glaciers which are habitually saturated with water in summer, the interior is little, if at all, reduced below the freezing point, even by the prolonged cold of winter; it would be contrary to all just theories of the propagation of heat if it were otherwise, when we recollect that the enormous mass of snow which such glaciers bear during the coldest months of the year, is a covering sufficient to prevent any profound congelation in common earth; and admitting that ice is probably a better conductor of heat than the ground, it is quite incredible that a thickness of many hundred feet of ice, saturated with fluid water, should be reduced much below the freezing point, or should even be frozen throughout.

" It thus appears quite certain that ice, under the circumstances in which we find it in the great bulk of glaciers, is in a state more or less *softened* even in winter; and that, during nearly the whole summer, whilst surrounded by air above 32°, and itself at that temperature, it has acquired a still greater degree of plasticity, due to the latent heat which it has then absorbed.

" I have mentioned that the observations of this and some previous summers have enabled me to extend the survey of the valley of Chamouni beyond the limits to which my Map was originally confined. I have also obtained a great number of approximate altitudes of all the highest summits of the chain of Mont Blanc, from the extended base which the distance from the Mont Breven to the Croix de Flégère (above 15,400 feet) has afforded me. But the results are as yet only partially calculated. I have also made some additions to our knowledge of the geography of the eastern part of the chain of Mont Blanc, by examining the Glacier of La Tour in its whole extent, which proved the configuration of the mountains to be different from what has been represented on all the maps and models which I have seen. The Glaciers of Argentière and La Tour are separated throughout by a rocky ridge, but the Glaciers of La Tour and Trient all but unite at their highest parts, and the main chain is prolonged with scarcely a break in the north-east direction, sending off only a spur towards the Col de Balme, which, perhaps from being the political boundary of Savoy and Switzerland, has been represented generally on an exaggerated scale. What surprised me most, was the great elevation of the axis of the chain at the head of the Glaciers of La Tour and Trient. I found it barometrically to be 4044 feet above the châlet of the Col de Balme, which, from five comparisons made with the observatory at Geneva, is 7291 English feet, or 2220 mètres above the sea, a result agreeing closely with the recent measurement by M. Favre, which is 2222 mètres. Adding this result to the former, we obtain 11,335 English feet for the height of the granitic axis at the lowest point between the Glaciers of La Tour and Salena on the side of the Swiss Val Ferret. By a single direct barometrical comparison with Geneva, I obtained 11,284 English feet above the sea, or 140 feet higher than the Col du Géant. I was successful in traversing the Glacier of Salena to Orsières the same day, a pass which has not before been described, and which has this interest, in addition to the singular wildness of the scenery, that it includes those regions of beautiful crystallized protogine, here *in situ*, which have been known to geologists hitherto chiefly from the numerous moraines which they form in the valleys of Ferret and of the Rhone, and especially the majority of the blocks of Monthey, which have been derived, according to M. de Buch, entirely from this region of the Alps."

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* Comptes Rendus, 29th April 1850.

Professor Forbes then gave a verbal notice of Dr Faraday's recent investigations on the Magnetism of Oxygen Gas and of the Atmosphere, including his views on the Diurnal Variation of the Needle.

Dr Spittal

Was balloted for, and duly re-elected a Fellow of the Society.

The following Gentlemen were duly elected Ordinary Fellows:—

Beriah Botfield, Esq., F.R.S., Norton Hall, Northamptonshire.
Dr James Scarth Combe.

The following Donations to the Library were announced:—

Journal of the Statistical Society of London. Vol. XIII., Pt. 3. 8vo.—*By the Society.*

Natuurkundige Verhandelingen van de Hollandsche Maatschappij der Wetenschappen te Haarlem. Diet. 5 & 6. 4to.—*By the Society.*

Astronomische Beobachtungen auf der K. Universitäts Sternwarte in Königsberg. Herausg. Von A. L. Busch. Abtheil. 29. fol.—*By the Observatory.*

Observations made at the Magnetical and Meteorological Observatory at Hobarton, in Van Diemen Island, and by the Antarctic Naval Expedition. Vol. I. 1841. 4to.—*By the Observatory.*

Proceedings of the American Philosophical Society. Vol. V., No. 44. 8vo.—*By the Society.*

Proceedings of the Zoological Society of London. Nos. 178–189. 8vo.—*By the Society.*

Proceedings of the Royal Society. Nos. 73 & 74. 8vo.—*By the Society.*

Seventeenth Annual Report of the Royal Cornwall Polytechnic Society. 1849. 8vo.—*By the Society.*

Journal of the Asiatic Society of Bengal. N. S. No. 37. 8vo.—*By the Society.*

Letter to the Rt. Hon. Lord Brougham and Vaux, containing proposals for a scientific exploration of Egypt and Ethiopia. By John James Wild. 8vo.—*By the Author.*

The Accommodation of the Eye to Distances. By William Clay Wallace, M.D. 8vo.—*By the Author.*

Oversigt over det Kgl. Dânske Videnskabernes Selskabs Forhandlinger og dets Medlemmers Arbeider i Aarets 1847 og 1848. 8vo.—*By the Society.*

Verhandelingen der Eerste Klasse van het K. Nederlandsche Instituut, &c. 3de Reeks. II. & IIIe Deel. 4to.

Jaarboek van het K. Nederlandsche Instituut, &c. Voor 1850. 8vo.

Tijdschrift voor de Wis-En Natuurkundige Wetenschappen, uitgegeven door de 1ste Klasse van het K. Nederlandsche Instituut. 3de Deel. 4e Aflevering. 8vo.—*By the Institute.*

Kongl. Vetenskaps Akademiens Handlingar under Sednare Hälften. 1848. 8vo.

Öfversigt af K. Vetenskaps-Akademiens Förhandlingar. 1849. Nres 1-9. 8vo.

Arsberättelse om Framstegen i Kemi under är 1848. Afgifen till K. Vetenskaps-Akademien af L. F. Svanberg. 8vo.

Medallion of Berzelius.—*By the Academy.*

Mémoires de l'Académie Impériale des Sciences de St Pétersbourg. Sciences Mathématiques, Physiques et Naturelles. Tomes 7me & 8me. 4to.

Mémoires présentés à l'Acad. Imp. des Sciences de St Pétersbourg. Tome 6me. Livraison 4me. 4to.

Recueil des Actes des Séances publiques de l'Acad. Imp. des Sciences de St Pétersbourg, tenues le 28 Decembre 1847 et le 29 Decembre 1848. 4to.—*By the Academy.*

Explication de la Carte Géologique de la France, rédigée par MM. Dufrénoy et Elie de Beaumont. Tomes 1 & 2. 4to.—*By the French Government.*

Geological Map of France.—*By the Same.*

Monday, 6th January 1851.

Sir D. BREWSTER, K.H., Vice-President, in the Chair.

The following Communications were read:—

1. Notice of a Tertiary Fossiliferous Deposit, underlying Basalt, on the Island of Mull. By the Duke of Argyll.

This paper, in its perfect form, appears in the Transactions of the Geological Society. The abstract read by His Grace on this occasion was illustrated by a number of drawings and specimens.

The order of beds shewn in the drawings, from above downwards, was as follows :—

1. A bed of basalt, rudely columnar.
2. A bed containing impressions of leaves of dicotyledonous trees.
3. A bed of tuff, or trap conglomerate, having the aspect of volcanic ashes.
4. A bed of leaves similar to No. 2.
5. A bed of tuff similar to No. 3.
6. A third bed of leaves similar to the two former.
7. A bed of amorphous basalt ending in basalt highly columnar.

2. Analysis of the Mineral Waters of Baden Baden. By Dr Sheridan Muspratt.

The author, after mentioning that no analysis of this water is to be found in any English work, and the great multitudes who resort to it, described briefly the situation of the Ursprung or original spring, the chief one at Baden, which was known to, and esteemed by, the Romans.

It has a temperature of 153·5° F., and contains, in the imperial gallon, 181·120 grains of solid matter. The predominating ingredient is chloride of sodium or common salt, which amounts to 132·6 grains in the gallon. Next to this comes carbonate of lime, dissolved no doubt as bicarbonate, which is deposited as carbonate on boiling. The other ingredients, which are in trifling quantity, are detailed in the first table given below as obtained in the analysis. In the second, they are arranged in the order of their probable occurrence in the water.

TABLE I.

	Grains per Imperial Gallon.	
Sulphuric acid,	3·487	3·495
Chlorine,	94·064	95·991
Silicic acid,	2·947	
Carbonic acid in combination with lime,	6·240	
Do. in combination with protoxide of iron,	·514	
Sodium,	52·152	
Potassium,	7·182	
Calcium,	4·000	
Lime (insoluble),	7·943	
Magnesia,	1·749	
Protoxide of iron,	·842	
Alumina, Phosphate of lime, Organic matter,	mere traces.	
	181·120	

TABLE II.

Statement of the constituents as existing in the water :—

	Grains per Imp. Gallon.
Chloride of sodium,	132·644
Chloride of potassium,	13·720
Chloride of calcium,	11·040
Carbonate of lime,	14·184
Silicic acid,	2·947
Proto-carbonate of iron,	1·556
Alumina, Phosphate of lime, Organic matter,	mere traces.
	181·127

Monday, 20*th January* 1851.

Dr CHRISTISON, Vice-President, in the Chair.

Some notices were given, by the Rev. J. Hannah, of an elaborate paper received, through Professor Jameson, from Mr J. R. Logan of Singapore. The following is the Author's own account of its nature and contents:—

1. Traces of an Ethnic Connection between the Basin of the Ganges and the Indian Archipelago, before the Advance of the Hindus into India; and a Comparison of the Languages of the Indo-Pacific Islanders with the Tibeto-Indian, Tibeto-Burmese, Telugu-Tamulian, Tartar-Japanese, and American Languages.

I.—*Preliminary Enquiries.*

§ 1. Principal continental connections of the Archaic ethnology of Asianesia.
§ 2. Physiological and moral evidence of an Indian connection.
§ 3. General ethnic principles and tendencies observable in the ethnology of Eastern Asia and Asianesia.
  a. Mutual physiological and moral action of tribes.
  b. Linguistic development and mutual action of tribes.
§ 4. Character of primordial phonology. Remnants of it in S. E. Asia.
§ 5. Cause of the transition from the monotonic to dissyllabic glossaries.
§ 6. Comparative value of structural and glossarial comparisons for ethnology. Superiority of the glossarial. Supreme importance of Phonology.

II.—*Phonetic and structural character of the archaic languages of India.*

§ 7. Prepositional and postpositional languages.
§ 8. Character of the Tibetan and Burmese with relation to each other and to the Tartarian and S. E. Asian languages.
§ 9. The N. Gangetic or Himalayan languages.
§ 10. The S. E. Gangetic languages.
§ 11. The S. Gangetic languages.
§ 12. The Telugu-Tamulian languages.
§ 13. Comparison of the Telugu-Tamulian with the African languages.

III.—*Phonetic and structural character of the Asianesian languages.*

§ 14. Australian.
§ 15. Polynesian.
§ 15.* Papuanesian.
§ 16. S. and S. E. Indonesian.
§ 17. N. E. Indonesian.
§ 18. W. Indonesian.

IV.—*The Asianesian languages compared with the American and Tartar-Japanese languages.*

§ 19.* Asianesian compared with American languages.
§ 20.* The Asianesian compared with the Japanese, Korian, and Tungusian languages.
    Sub sect. 1. Japanese.
    — 2. Korian.
    — 3. Manchu.
    — 4. Results.

V.—*Ethnic Glossology.*

§ 19. Principles of glossarial comparison.
§ 20. Character of Asianesian glossology.
§ 21. Permutations of sounds.
§ 22. Comparison of Definite, Segregative, and Generic words or particles.
§ 23. Pronouns.
§ 24. Numerals.
§ 25. Names of parts of the body.
§ 26. Names of domesticated animals.
§ 27. Miscellaneous words.

Conclusion.

Several lengthy extracts were read, to illustrate, *first*, the relation which the author's historical views bear to those of previous inquirers in the same field; and, *secondly*, the theory, on the origin and progress of language, upon which his arguments are mainly rested.

2. The following Note was read on the recent frequent occurrence of the Lunar Rainbow, by George Buchanan, Esq.

The frequent occurrence of this phenomenon lately suggests the idea, whether it be any way connected with the relation of the atmosphere to an electric or other condition.

On Thursday evening last, at 7 o'clock, I observed a very beautiful rainbow, from Duke Street, extending in a brilliant and unbroken arch in a westerly direction; the south end springing from the west end of Queen Street, and the north end stretching to the eastern extremity of Abercromby Place, comprising a space in the horizon of 60° or 70°, and rising 16° or 18° in altitude.

The prevailing colour was whitish, but occasionally the prismatic colours shone out very distinctly, particularly the *red* and the *blue.*

The weather was squally, with showers, and the bow appeared for at least half an hour.

Last night (Sunday evening) the same appearance was seen with beautiful effect at 11 P.M., and continued for upwards of half an hour.

The following Donations to the Library were announced:—

Proceedings of the Academy of Natural Science of Philadelphia. Vol. V., No. 5. 8vo.—*From the Academy.*

The American Journal of Science and Arts. 2d Ser., No. 30. 8vo.—*From the Editors.*

Proceedings of the Royal Astronomical Society of London. Vol. II., No. 2. 8vo.—*From the Society.*

Résumé Météorologique de l'Année 1849, pour Genève et le Grand St Bernard, par E. Plantamour. 8vo.—*From the Author.*

Reasons for returning the Gold Medal of the Geographical Society of France, and of withdrawing from its membership. In a Letter to M. De la Roquette, from Charles T. Beke. 8vo.—*From the Author.*

Astronomical and Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1849. 4to.

Greenwich Magnetical and Meteorological Results. 1848. 4to.—*From the Observatory.*

Astronomical Observations made at the Observatory of Cambridge. Vol. XVI., 4to.—*From the Observatory.*

Transactions of the Cambridge Philosophical Society. Vol. IX., Part. 1. 4to.—*From the Society.*

Monday, 3*d February* 1851.

Sir T. M. BRISBANE, Bart., President, in the Chair.

The following Communications were read:—

1. On some new Marine Animals, discovered during a cruise among the Hebrides with Robert Macandrew, Esq., of Liverpool, in 1850. By Professors Edward Forbes and J. Goodsir. Communicated by Professor Goodsir.

The animals either wholly new, or new to Britain, described in this communication, were taken during a yachting cruise with Mr Macandrew, of Liverpool, among the Hebrides, in the month of August 1850. During this voyage, which lasted three weeks, a series of observations were conducted by means of the dredge and towing-net. Not a single new testaceous Mollusk was procured; but several remarkable Ascidians and Radiata were discovered, some of them so curious in themselves, and so important in their zoological bearings, that the authors of this paper thought it desirable to lay an account of them before the Royal Society of Edinburgh.

The most remarkable of these is the longest compound Ascidian yet discovered in the Atlantic. Its nearest described ally is the genus *Diazona* of Savigny, between which animal and *Clavellina* it forms a link. The authors of this paper propose to designate this animal *Syntethys Hebridia*, having found it necessary to establish a genus for its reception. The authors have also dredged up the *Holothuria intestinalis* of Ascanius and Rathke, which is the second species of *Holothuria* proper discovered in the British seas; the first having being discovered by Mr Peach under the name of "Nigger," given to it by the Cornish fishermen.

A new species of the curious genus *Sarcodictyon*, distinguished by the polype cells being grouped in assemblages of from three to five, was described under the designation of *S. agglomeratum*.

The *Arachnactis albida* of Sars was found in the Minch. Portions of an animal found by Professor Balfour in the same locality in 1841, have now been recognised as belonging to this curious Actinea.

The other animals described in this communication were, a species of naked-eyed Medusa, for the reception of which the authors found it necessary to establish a new genus, *Plancia* (*Plancia gracilis.*) Seven new species of Medusæ, referable to the genera *Oceanea*, *Slabberia*, *Hippocrene*, and *Thaumantias*, were also described.

The communication was illustrated by coloured drawings.

2. Account of Experiments on the Thermotic Effect of the Compression of Air, with some practical applications. By Professor C. Piazzi Smyth.

3. Theoretical investigations into the same by W. Petrie, Esq. Communicated by Professor C. Piazzi Smyth.

Having brought before this Society in April 1849, a plan for cooling the air of rooms in tropical climates, the author was anxious to determine by actual experiment on a very large scale the practicability of the principle involved, viz., the thermotic effect of the compression of air. He had had a small apparatus made in 1844, which, though not sufficiently large to give exact numerical data, at least showed that the plan was in the bounds of possibility.

But in December 1849, Mr Wilson, of the Kinniel Ironworks, having kindly allowed him to experiment on the compressed air in the reservoir tubes of the furnaces, Professor P. S. proceeded there in company with Mr Stirling, C.E., and Capt. Gosset, R.E., with an apparatus which was exhibited on the table.

Thirty-four different experiments were made, in as varied a way as possible to insure accuracy, and the mean result was, that the air being at 63° Fahr., and the barometer at 30· inches, and the pressure guage indicating 7·2 inches of mercury, the rise of temperature of the air on being made to enter the compression-chest, was 28°·9, and the fall on escaping therefrom was 26°·9.

Professor W. Thomson, from Carnot's theory of heat, and Mr Macquorn Rankine from his own, deduced nearly the same quantity, but with some uncertainty, as the specific heat of air was involved.

Mr Petrie, however, without taking up any theory of heat, but merely the mechanical nature of a compressible fluid, and the well known quantity of the expansion of air from heat, deduced a formula which represented the above observations as well as could be expected. And pursuing his formula to its ultimate consequences, he arrived at the interesting result, that beginning with air at 60° Fahr., unlimited *expansion* would only lower it 550°; while by sufficiently increasing the *compression*, an infinite degree of heat could be produced.

The practical result of the experiments and conclusions from theory was to make the proposed method of cooling the air of rooms (viz., by compressing the air, depriving it when compressed of its extra heat, and then allowing it to escape into the room to be cooled),—very possible indeed.

While, to get over the difficulty that might be experienced in the colonies of managing the air pumps and coolers which would be required according to Professor P. S.'s plan, Mr Petrie proposed some simple forms of water-pressure machines, and air-compressing wheels.

The following Gentleman was duly elected an Ordinary Fellow:—

Sir DAVID DUNDAS, Bart., of Duneira.

The following Donations to the Library were announced:—

Proceedings of the Royal Astronomical Society of London. Vol. II., No. 1. 8vo.—*By the Society.*

On the Cyclone of November 19 (1850). By the Rev. Humphrey Lloyd, D.D. 8vo.

On the Induction of Soft Iron, as applied to the determination of the changes of the Earth's Magnetic force. By the Rev. Humphrey Lloyd, D.D. 8vo.—*By the Author.*

Instructions for Making Meteorological and Tidal Observations. Prepared by the Council of the Royal Irish Academy. 8vo.

Second Report of the Council of the Royal Irish Academy, relative to the establishment of a System of Meteorological and Tidal Observations in Ireland. 8vo.—*By the Academy.*

The London University Calendar. 1851. 12mo.—*By the Publishers.*

Monday, February 17, 1851.

Dr CHRISTISON, Vice-President, in the Chair.

The following Communications were read:—

1. Biographical Notice of the late Robert Stevenson, Esq., Civil Engineer. By his Son, Alan Stevenson, L.L.B. Communicated by Dr T. S. Traill.

This memoir commences by stating that Mr Stevenson was born at Glasgow on the 5th May 1772, and that he died at Edinburgh, in the seventy-ninth year of his age, on the 12th July 1850. The writer then notices the disadvantages under which Mr Stevenson laboured in infancy and youth, owing to the death of his father, who was a partner in a West India House in Glasgow, and died in the Island of St Christophers soon after the birth of his only child. In spite of these, and by the prudence and energy of his mother, Robert Stevenson had the benefit of a tolerably full course of training both in science and literature, first at the Andersonian Institution in Glasgow, and afterwards at the University of Edinburgh; and so great was his zeal in the pursuit of knowledge, that, while acting during the summer as a superintendent of works, under Mr Smith, the engineer of the Lighthouse Board, his future father-in-law, he regularly devoted the winter months to the study of mathematics, natural philosophy, chemistry, and architectural drawing. Some pretty long extracts from some MSS. memoranda, left by Mr Stevenson himself, and from his "Account of the Bell Rock Lighthouse," next follows; and in them an interesting view is given of his early designs for the Bell Rock Lighthouse, and of the difficulties with which he had to contend, and the encouragements he met with in reference to his great enterprise. The writer then goes on very briefly to notice his father's long service of about forty years as engineer to the Commissioners of the Northern Lighthouses, in which office he succeeded his father-in-law, Mr Smith, in 1806. During that period, he was the architect of no fewer than twenty-three lighthouses, including that of the Bell Rock; and through his indefatigable zeal and patient skill, the catoptric system of lighthouse illumination was in Scotland brought to a state of perfection which has not elsewhere been equalled. Many of those improvements he was the means of extending to the lighthouses of Ireland and of some of the colonies. He also invented two valuable additions to the mode of distinguishing lights on a coast, known as the *intermittent* and *flashing* lights, the latter of which, in particular, has been generally approved by seamen; and so much was the late King of the Netherlands pleased with the arrangement and effect of this distinction, of which he had read an account, that he sent to Mr Stevenson a gold medal as a mark of his approbation. The memoir next notices Mr Stevenson's career as a practitioner in his profession of a civil engineer, in the course of which it is not perhaps generally known that he designed and executed the eastern approach to Edinburgh by the Calton Hill; and, after alluding to several of his works in bridges and harbours, it mentions his improvements in the construction of timber and suspension bridges, and notices his connection with the first introduction of the railway system into Great Britain, and his contributions to various scientific journals, and to literature of his own profession. In conclusion, the writer briefly touches upon the private character of his father, and the esteem in which he was held by all who knew him, and more especially by the Commissioners of the Northern Lighthouses, who, in 1824, ordered his bust to be placed in the Bell Rock Lighthouse, and, on the occasion of his death, recorded in the Minutes of the Board their respect for his talents as a public officer and his virtues as a man.

2. Historical Notice of the Progress of the Ordnance Survey in Scotland. By Alexander Keith Johnston, Esq.

There are few places on the earth's surface which, within such a limited area, combine so many of the requisite elements for chartographic delineation as are met with in Scotland. With mountains rising almost to the limit of the snow-line, and an extensive sea-board, broken up by firths and lochs into every conceivable form of promontory, cape, and headland, this portion of Great Britain comprises within itself such a variety of physical features as is only found elsewhere distributed over much more extensive regions. It cannot be doubted, therefore, that a properly constructed map of Scotland, on a scale sufficiently distinct, if executed with fidelity, and with all the improvements of modern art, would present at once a most pleasing and highly instructive example of this species of design. That we do not already possess such a map, is not owing to any want of interest in the subject on the part of our countrymen, for Scotland has produced more works of this class than perhaps any other country of similar extent and means. But these efforts, however creditable in themselves, could not be connected so as to produce a perfect map, for want of such a basis of union, as a complete system of triangulation alone could supply. Now, this was a work which, from its vast extent and labour, required the resources of Government to accomplish, and hence the necessity for the so-called Ordnance or Government Survey, to trace the progress of which is the object of this Paper.

The first map of Scotland on record is that attributed to Ptolemy, the geographer of Alexandria, A. D. 140. In this celebrated work, it is well known the bearings are altogether wrong, as the upper part of Britain is represented bending to the east instead of stretching to the north. Nothing further of this kind worthy of notice occurs till the 14th century, when Richard of Cirencester compiled a map, in which, though he generally follows Ptolemy, he gives the true bearings of the country, and greatly adds to our knowledge of British geography.

Timothy Pont was the first projector of an atlas of Scotland. In 1608 he commenced a survey of all the counties and islands, sketching in the features on the spot. He died before his work was finished, and in 1646 his drafts and notes were put into the hands of Sir Robert Gordon of Straloch, who completed his design. All the sketches and notes thus collected were transmitted to Bleau of Amsterdam, who published his *Atlas Scotiæ* in 1654. This atlas, begun at the charge of Sir John Scott, of Scotstarvet, director of the Chancery in Scotland, was, probably, carried on and completed at the national expense. These maps, which are wonderful productions for the time, may, however, be regarded simply as literary curiosities, interesting chiefly to the antiquary.

About the year 1688, Adair made a survey, and gave descriptions of the coasts of Scotland, which he published in a small atlas; but his sketches, as well as those of Sanson, Elphinstone, and Grierson, who succeeded him, are very inaccurate. The Rev. Alexander Bryce surveyed the northern coasts of Scotland about the year 1740; his map, published in 1744, made considerable advances in accuracy. In 1750, John Dorret, land-surveyor, published a map of Scotland, in five sheets, at the expense of the Duke of Argyll. This map had more pretension than any that preceded it, being on a much larger scale, but in construction it is still very inaccurate. Between 1751 and 1771, Mr Murdoch Mackenzie, who was employed by the Admiralty, surveyed the western coasts of Britain, from the English Channel to Cape Wrath, including the Hebrides from Lewis to Islay, and extending to the Orkney Islands. His charts were published on a scale of one inch to a mile, and were accompanied by nautical descriptions. These were considered, at the time, entitled to credit, but the recent Admiralty Surveys have proved them to be exceedingly erroneous.

In 1789, John Ainslie, an eminent land-surveyor in Edinburgh, constructed, engraved, and published a map of Scotland and its islands in nine sheets. This was the first good map of the country. The author had made an actual survey of several counties, when he was employed by the Board of Customs to survey the east coasts of North Britain; he also made many rapid surveys and sketches in remote districts. Still, though superior to any that preceded it, his map is very faulty in construction. In Ainslie's time the delineation of the physical features of a country was little understood; his mountains and hills are represented as rising insulated from their bases; no indications are given of the water-sheds dividing the river basins, and little attention is paid to the subject of light and shade. In 1792 Murdo Downie published a chart of the east coast of Scotland, in which the sea-board is very inaccurate.

The Government felt so greatly the want of a tolerable map of Scotland, during the rebellion of 1745-6, that, on its suppression, it was resolved, at the suggestion of the Duke of Cumberland, to commence an actual survey of the whole country. This undertaking was confided to Colonel Watson, who employed in the service several young officers of engineers, among others, Mr (afterwards Major-General) Roy. The survey, which was limited to the mainland, was commenced in 1747, and completed in 1755. It was conducted with considerable skill, and was the means of illustrating many of the Roman antiquities of North Britain. The field work was carried on in summer, and the drawings were prepared in Edinburgh Castle during the winter months. Of this work, General Roy himself says that, "having been carried on with inferior instruments, and the sum allowed having been very inadequate for its proper execution, it is rather to be considered as a magnificent military sketch than a very accurate map of a country." When the drafts of this map were finished, they were deposited in the Royal Library, where they lay totally forgotten till 1804, when being required for a new map of Scotland, undertaken by Arrowsmith, at the suggestion of the Commissioners of Highland roads and bridges, they were discovered after considerable search.

Arrowsmith's map was founded on Roy's survey of the mainland, and many other materials which he deemed authentic. It was commenced in 1805 and finished in 1807, on a scale of $\frac{1}{4}$th of an inch to a mile or $\frac{1}{7}$th of the scale of the military survey. Since Arrowsmith's map appeared, many portions of the country have been surveyed and published, some of these, among which may be specially noted, Lanarkshire by Forrest, Mid-Lothian by Knox, Sutherlandshire by Burnett and Scott, and Edinburgh, Fife, and Haddington by Greenwood, have been deservedly reputed. But, as must ever be the case in private enterprises, these are confined to the wealthier and more populous districts, no recent survey having been made of any of the more remote regions. The latest effort of this kind, which is likely to prove the last, is the survey of Edinburgh and Leith within the Parliamentary boundaries, on the scale of 5 feet to a mile, by W. and A. K. Johnston, a reduction of which has recently appeared.

The principal triangulation for the Ordnance Survey of Britain commenced by General Roy, on Hounslow Heath, near London, in 1784, was extended to Scotland in 1809, but the operations were discontinued for the three following years, the persons employed having been removed to England. In 1813 the Ordnance zenith sector was used on Kellie Law, Fife, and Cowhythe, Banffshire. In 1814-15-16 the triangulation proceeded steadily. In 1817 the zenith sector was used on Balta Island, Zetland, a new base line was measured on Belhelvie Links, near Aberdeen, and the triangulation again proceeded in 1818-19. It was suspended in 1820, but re-commenced in 1821-22, in Zetland, Orkney, and the Western Islands. In 1823 the large theodolite was removed to England and afterwards to Ireland, in consequence of which the operations in Scotland were entirely suspended during a period of sixteen years. In 1838-39-40 and 41, the triangulation for connecting the islands with each other, and with the mainland, proceeded without interruption. The principal operations are now completed, with the exception of certain observations that may be required for a few stations, with a view to its publication as a scientific work.

In 1815 the Ordnance department appointed Dr M'Culloch to make a geological examination of Scotland; his researches were continued till 1821, but for want of an accurate topographical map, his labours have unfortunately done much less service than they otherwise would have done to the cause of science.

In 1819 a military detailed survey of part of Wigtonshire and Ayrshire was commenced on a scale of 2 inches to a mile, by Capt. Hobbs and two subalterns; it was carried on, with diminishing numbers, till 1827, and extended over a space of about 937 square miles. But a survey conducted at so slow a rate, and on so small a scale, afforded no proper ground for commencing a map of Scotland, and the plans will furnish no aid whatever for the general survey.

In 1834 the Ordnance carried forward a partial secondary triangulation along the Scottish coast, from the Solway Firth to the Firth of Clyde for the use of the Admiralty surveyors.

TABLE SHOWING PROGRESS OF SURVEY.

	Survey commenced.	No. of Officers and Men employed in June 1849.	Total sum expended to 1850.	Average Annual Grant.	State of Survey in 1851.	Estimated Sum required to complete Survey.	Estimated Time required to complete survey at present rate.	REMARKS.
ENGLAND. Area 37,094,400 acres.	Triangulation, 1784. Survey on 1 inch scale, 1791. Survey on 6 inch scale, 1840.	736 chiefly in the northern.	£702,000	During 60 yrs. since commencement of survey, the average grant has been nearly £12,000.	Nearly ⅘ths of England and Wales are surveyed and published on the 1 inch scale. The remainder, comprising the six northern counties, is in progress, on the 6 inch scale. It is proposed afterwards to reduce the maps of these six counties in order to complete the map on the 1 inch scale. The surveys of Lancashire and Yorkshire have been completed on the 6 inch scale. It is intended, ultimately, to extend the survey on the 6 inch scale, over the whole of England, and to survey all towns, the population of which exceeds 4000.	To complete the survey of the northern counties on the 6 inch scale, £285,000. The estimated sum necessary to complete the survey of the southern portion of the country on the 6 inch scale, is £1,600,000. Expense of surveying the towns and completing the map on the 1 inch scale not yet estimated.	"With the present force at the disposal of the Ordnance the time would be endless"*	The new survey of the southern portion, on the 6 inch scale, could be done in twenty years, if unlimited funds were supplied. About 250 towns remain to be surveyed, besides those in progress in the northern counties.

SCOTLAND. Area 18,944,000 acres.	Primary Triangulation, 1809. Secondary Triangulation, 1841. Survey of South Portion, 1844.	257, only two officers, one in Edinburgh and one in the island of Lewis.	£66,000	The average grant during forty-one years has been £1609, 15s. From 1843 to 1849 the grants have varied from £9000 to £15000 but part of this has been expended in England and Ireland.	The primary and secondary triangulations are completed, with the exception of a few observations and corrections. The county of Wigton is published in 38 sheets. Kirkcudbright is surveyed, and partly in the hands of the engravers. The island of Lewis is in progress, and about $\frac{3}{5}$ths of the plans are being engraved. The county and city of Edinburgh are in progress of being surveyed. The towns of Dumfries, Wigton, and Stranraer, are surveyed, and the drawings of the plans are nearly completed.	£740,000 to complete the survey of the 6 inch scale.	50 years at least.	In order to complete the survey in ten years, the present force, and consequently the present grant, would require to be increased five times. That is to say, the force employed would require to be 1285 officers and men, and the annual grant £50,000. £25,000 would, in the same proportion, be required to complete the work in twenty years. But all the evidence produced is to the effect that the more rapidly the work is carried on, the greater will be the ultimate economy.
IRELAND. Area 20,808,271 acres.	Survey 1825.	1210. employed in contouring and revising the map.	£820,000	Average nearly £40,000 per annum. Occasionally nearly £70,000 per annum.	The survey of the country was *completed* and published in 1846, on the 6 inch scale. It is comprised in 1907 sheets (exclusive of 32 index maps), and is now sold for £400. Plans of ninety-five towns are surveyed and drawn. The plan of Dublin is engraved and published. The system of contour lines commenced in 1838 is now in progress; and the northern portion of the country is being revised and corrected.	£200,000, for the following purposes:— To complete the contouring, £120,000. To complete the revisal of northern portion now in progress, £80,000. Expense of surveying and engraving plans of towns not estimated.	30 or 40 years to complete the contours. Time for revisal not estimated.	A very large force (number not specified) would be necessary to complete the revisal and contouring within a few years. ——— A map of Ireland, on the scale of 1 inch to a mile, was originally contemplated. Its execution is postponed. The estimated cost of reducing from the 6 inch plans and engraving is £83,604.

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* Parliam. Papers, 1849, vol. ix. p. 499.

In 1840 the Board of Ordnance and the Treasury directed that the survey of Scotland should be laid down on a scale of 6 inches to a mile to correspond with that of Ireland.

The secondary operations of the survey in Scotland have been carried on since 1841. In the beginning of 1844 the detailed survey of the county of Wigton was begun; it was completed in 1850 and is now engraved on the 6 inch scale, with contour lines, or lines of equal elevation, and published in 38 sheets. The survey of the county of Kirkcudbright was commenced in 1845, and it is expected that it will be finished and portions of it published during the present year.

In July 1846 the survey of the island of Lewis was commenced, out of due course, in consequence of an arrangement with the proprietor, by which he agreed to pay to the Government the sum of £1200, and to purchase 100 copies of the published maps. In January 1851 about three-fifths of this survey were completed, some of the sheets will be published during the present year, and it is expected that the whole will be finished during 1852.

In March 1850 the surveying party was removed from Wigton and Kirkcudbright shires to Mid-Lothian and the city of Edinburgh. The survey of the city is now considerably advanced, and it is expected that some of the sheets will be published in 1852. It is proposed to be engraved in outline, *i. e.*, without shading or distinction of houses from streets, on a scale of 5 feet to a mile.

The survey of the county of Edinburgh is going on, and has also made considerable progress. Plans of the towns of Wigton and Stranraer have been surveyed, on the scale of 5 feet to a mile. The town of Dumfries is surveyed, and the drawing plans are nearly finished.

This comprises all that has yet been done by the Ordnance Surveyors in North Britain.

From these statements we learn that the survey of Scotland was begun in 1809, but its progress appears to have been considered of so little importance in comparison with the surveys of other portions of the kingdom, that, whenever it was found convenient, the whole of the men and instruments employed were unceremoniously removed to England or Ireland; and that, in order to expedite the work in the latter country, the operations in Scotland were on one occasion altogether suspended during a period of sixteen years.

It will be seen from the preceding table that the total sum expended on the survey in Scotland from its commencement to the present time, has been only £66,000; while the sum expended in England is £702,000; and in Ireland, £820,000; and that, in June 1849, the number of men employed in Ireland was 1210, while in Scotland the number employed was only 257.

The average annual expenditure on the survey of Scotland during the forty-one years of its progress has been only £1609, or, omitting the sixteen years when the operations were suspended, £2640; while on that of Ireland the average expenditure has been nearly £40,000 per annum. In the Parliamentary reports on this subject, it is stated that, in 1843, the sum voted for the survey of the whole kingdom was £60,000, of which only £9000 was appropriated to Scotland; and, since 1843, the sum allotted to the survey of Scotland has averaged little more than £10,000 per annum, the same amount which is voted annually for *revising* the maps of the northern counties of Ireland already surveyed! Besides the sum of £820,000 already expended in Ireland, it is proposed to expend for the revisal of the northern counties above alluded to, £80,000; and, for completing the system of contour lines (now in progress), the further sum of £120,000, making in all £1,020,000, exclusive of the expense of engraving plans of ninety-five towns, which are surveyed and drawn.

From these reports we learn further, that the largest amount hitherto granted for the purposes of the survey in Scotland in any one year has been £15,000, and as admitted in evidence although larger sums have frequently been voted to Scotland, they have often been expended in England and Ireland. The consequence of this treatment has been, that, after a lingering progress extending over a period of forty-one years, the survey of Scotland is still little more than begun, the map of only one county, that of Wigton, forming about a sixty-fourth part of the area of the country, being published, while the survey of the whole of Ireland has been completed and published for several years, having been commenced in 1825 and finished in 1843, and that of England is now nearly finished.

A very general feeling exists in the public mind that, in this matter, Scotland has experienced most unmerited neglect, and since the expectation of immediate progress, occasioned by the fact that the Ordnance surveyors have occupied the ground, is doomed to certain disappointment if things are allowed to continue as they are, it is to be hoped that means may at once be devised for ensuring a more satisfactory result.

The desired object might probably be best attained by such an arrangement as would ensure the entry, in the annual Ordnance estimates, of a specific sum to be devoted to this special purpose.

The amount needed depends of course on the time within which it is required to finish the work. It is shown in the table that, at the present rate of progress, *fifty years* would be necessary for its accomplishment. Now, assuming that the efficiency of the force would be in direct proportion to the numbers employed, and since the numbers are dependent on the money grants, it is clear that five times the present force or five times the amount granted would finish the survey in a fifth part of the time, or in ten years. The sum at present voted for the survey in all parts of the kingdom is £60,000, but it is shown in evidence, that if the whole force of surveyors and others capable of conducting the work are to be taken into pay, the sum of £100,000 will be required. Now, if the difference between the amount granted and that required—£40,000 a year—were voted to Scotland (in addition to the average sum of £10,000), the survey of this portion of the country would be completed in *ten years* from this date, and that without prejudice to the surveys now carried on in England and Ireland. But if it should be objected that the sum of £100,000 a year is more than could now be granted for this purpose, the question remains whether, if it cannot be otherwise attained, the speedy completion of the survey in Scotland should not be secured by suspending for a time the operations for *contouring* the map of Ireland, and for *revising* the survey of its northern portion.

Should the necessary funds be granted, it is satisfactory to know that a sufficient number of competent and well-trained surveyors and others formerly employed in Ireland, but whose services are not now required there, may at once be engaged on the survey in Scotland, and that the engraving of the maps can be carried on simultaneously with the surveying, so that no delay in the publication would be occasioned on this account.

Having recently had an opportunity of inspecting the Ordnance Survey Office at Southampton, so ably conducted under the direction of Colonel Hall and Captain Yolland, I have pleasure in bearing testimony to the excellence of the methods there employed for securing accuracy and expediting the work, the latter especially, by the extensive introduction of mechanical processes of engraving, and the masterly application of the electrotype for procuring duplicates of the copperplates.

Intimately connected with the survey of the interior, and of even greater importance to the commerce of the country, is that of the sea-coasts, carried on under the Lords Commissioners of the Admiralty. It is not many years since attention was drawn by the late Mr Galbraith to the very erroneous character of all the published charts and sailing directions then available for the Firth of Clyde, in which it is shown "that the master of a vessel, trusting to the charts then in ordinary use, would almost certainly be wrecked if his reckonings were right."

It is gratifying to find that danger from this cause no longer exists in that quarter, admirable surveys being now completed of the River and Firth of Clyde, and of the lochs connected with them, many of the sheets of which are already published, and the others are in course of being engraved. The whole of the north, south, and east coasts of Scotland, with the Shetland and Orkney Islands, have been surveyed, and most of the sheets are published. The western coast of Sutherland is also surveyed, so that the portion of this great work still remaining to be accomplished comprises the coasts of Ross, Inverness, Argyll, and the Hebrides. All these surveys have been conducted by able and experienced officers under the enlightened and zealous superintendence of the Hydrographer Royal, Admiral Sir Francis Beaufort, who, in his anxiety to insure the utmost attainable accuracy, revises and corrects with his own hand every sheet of the survey before it is sent to press.

Mr Johnston then exhibited a map, shewing by colours the present state of the Ordnance and Hydrographical surveys in Scotland, and a comparative table of the proportionate scales of maps constructed from the surveys of different countries in Europe.

The following Gentleman was duly elected an Ordinary Fellow :—

Sir George Douglas, Bart., of Springwood Park.

The following Donations to the Library were announced:—

Essai Historique sur le Magnétisme et l'Universalité de son influence dans la Nature. Par M. de Haldat. 8vo.

Optique Oculaire suivie d'un essai sur l'Achromatisme de l'Oeil. Par M. de Haldat. 8vo.—*From the Author.*

On the Remains of Man, and Works of Art imbedded in Rocks and Strata, as illustrative of the connection between Archæology and Geology. By G. A. Mantell, LL.D. 8vo.—*From the Author.*

American Journal of Science and Arts. Vol. II., No. 31. 8vo. *From the Editors.*

Acta Societatis Scientiarum Fennicæ. Tom. III. Fasciculus I. 4to. —*From the Society.*

Novorum Actorum Academiæ Cæsareæ Leopold. Carol. Naturæ Curiosarum. Vol. XXII., Pars. II. 4to.—*From the Academy.*

Abhandlungen der K. Akademie der Wissenschaften zu Berlin. 1848. 4to.

Monatsbericht der K. Akademie der Wissenschaften zu Berlin. Juli 1849; Juni 1850. 8vo.—*From the Academy.*

French Marine Charts, with corresponding Descriptions.—*From the French Government.*

Ueber eine Kochsalz herrührende pseudomorphische Bildung im Muschelkalke der Wifergegend. Von J. F. L. Hausmann. 8vo.

Die Bleigewinnung in Südlichen Spanien in Jahre 1829. Von J. F. L. Hausmann. 8vo. 11 OC 51

Ueber die Erscheinung des Anlaufens der Mineralkörper. Von J. F. L. Hausmann. 8vo.—*From the Author.*

Nachrichten von der Georg. Augusts. Universität. und der K. Gesellschaft der Wissenschaften zu Göttingen. Von Jahre 1849. Nr. 1–14. 12°.—*From the University.*